

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of)

Digital Data Transmission Within the Video Portion)
of Television Broadcast Station Transmissions)
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)

MM Docket No. 95-42

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REPLY OF DIGIDECK, INCORPORATED

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REPLY OF DIGIDECK, INCORPORATED TO COMMENTS ON NPRM

I. INTRODUCTION

Pursuant to Rule 1.415 of the Rules of the Federal Communications Commission ("Commission"), Digideck, Incorporated ("Digideck") hereby files this Reply to Comments submitted by other parties regarding the Commission's Notice of Proposed Rule Making ("Notice") in the above-referenced proceeding.^{1/}

In the Notice, the Commission proposed to permit the transmission of digital data within the video portion of television broadcast station transmissions, and sought guidance regarding appropriate rules and regulations to govern such transmissions, as well as further information on certain subjects, including Digideck's D-Channel system. We stated our belief that such activity should be encouraged and recognized as vital to the

^{1/} Notice of Proposed Rule Making, MM Docket No. 95-42, FCC 95-155 (April 10, 1995).

competitiveness of the broadcast television industry, and supported the concept of a general purpose data broadcast standard with accompanying rules that allow the industry to compete fairly with other media.

II. BACKGROUND

Commenters to the Notice appeared to be unanimous in their support for NTSC-based data broadcasting. In this we concur.

The major disputes we have with certain of the comments^{1/-4/} concern whether a standard should be determined and rules governing data broadcasting operations issued, or whether broadcasters should be allowed to transmit data making their own choices and assuming the market consequences for their actions. In the following we provide rebuttal to comments opposed to issuance of a standard and associated rules. In addition, we reply to comments specifically or potentially relevant to the D-Channel system^{1/,5/,6/}, as well as noting our agreement with certain comments raised by others.

^{1/} Comments of A.C. Nielsen Company, dated June 23, 1995.

^{2/} Comments of Radio Telecom & Technology Inc., dated June 23, 1995.

^{3/} Comments of WavePhore, Inc., dated June 23, 1995.

^{4/} Comments of Yes! Entertainment Corporation, dated June 23, 1995.

^{5/} Comments of Comsat Corporation, dated June 23, 1995.

^{6/} Comments of Zenith Electronics Corporation, dated 23 June 1995.

III. **DISCUSSION**

1. *A Standard is Required*

A number of commenters took the position that the Commission should not establish an industry standard for NTSC-compatible data broadcasting. Several^{7/} submitted the routine arguments:

- Standards stifle future innovation
- Let the marketplace decide
- Licensees should be the judge of their own signal quality

These are not new arguments, nor are they unique to broadcast television, nevertheless industries worldwide continue to find it more valuable to adopt standards.

Setting standards allows larger industries, such as broadcast television, to move a technology more quickly from acceptance into widespread use; waiting for the marketplace to select de facto winners usually takes longer. RTT's example (RTT ¶15) in favor of marketplace determination -- the classic Beta-VHS battle -- took over ten years to resolve and is actually better as a counterexample. Nielsen's Videocipher example (Nielsen ¶23) is inapplicable. At the time of the Videocipher decision the cable industry was dominated by a single programmer, HBO. Following HBO's selection of the Videocipher system, General Instrument, the leading cable equipment vendor, purchased the developing company, thereby cementing a de facto situation. In marked contrast, today's broadcast television industry has no such dominant party(s) to act as a de facto market maker.

^{7/} Nielsen, RTT, WavePhore and Yes! Entertainment.

Second, it is common knowledge that costs are lower when multiple vendors compete in a system of standardized products. But it is often overlooked that manufacturers, being legally required to provide long-term support to their products, hesitate to adopt even readily affordable technologies which lack industry acceptance. Example -- AM radio stereo.

Perhaps the question should be decided on whether there are unique aspects to this particular subject which tilt against the establishment of a standard. Only the Nielsen Company argued for this position.

Nielsen claimed (§26) that "...each of the transmission technologies noted by the Commission in the NPRM was created to address and satisfy the unique need of specific users", illustrating the point by contrasting their needs for survival of very low data rate SID Codes through the long-distance distribution network against locally distributed high-speed computer-type applications proposed by WavePhore, submitting (§15-17) that subvideo techniques will not survive the impending use of digital video compression in distribution links, and concluding (§26) that "...[the adoption of] a model or...a 'standard' *per se* will inhibit the development of alternatives that might more efficiently, more effectively or otherwise, better serve the public's needs."

Nielsen's needs, however, are *not* unique. Virtually all data broadcasting applications will need a method of data transport through some form of nationwide distribution network. And many of the proposed applications are content-related which, like Nielsen's, require a transport method that maintains timing between data and program. Nielsen's requirements will be met in some way by any technology, including a general purpose standard, if it expects to receive widespread industry acceptance.

Most important, Nielsen's desire for a convenient way to solve their highly specialized application should not be allowed to override the fundamental need of broadcasters and receiver manufacturers for a more general purpose standard, to be used for services potentially involving millions to tens of millions of units.

WavePhore noted (WavePhore, note 1/) that their discussions with TV set manufacturers indicated that decoder chip sets would be too expensive for even high end sets for the foreseeable future. This led them to conclude that the major part of the data broadcasting market will consist of [moderate volume] non-content-related applications, using specialized decoders and thus requiring little or no need for standards.

To the contrary, our own discussions with a major receiver manufacturer leads us to believe that D-Channel chip sets *can* be made sufficiently inexpensive for inclusion in high end sets and beyond, and that the major volume market could well be content-enhanced programming for the general public. As proof, consider the BBC-developed NICAM digital stereo audio system, which is now standard in all high end sets sold in the UK and several other countries. NICAM uses signalling methods (DQPSK) and data rates (728 kbps) nearly identical to the D-Channel. NICAM chip sets are available from Philips and Texas Instruments among others, and are now in third generation all-digital form.

In arguing for the establishment of a standard, we concur with the comments of the National Association of Broadcasters, the Consumer Electronics Group of the Electronics Industries Association, Maximum Service Television, Inc., and Chris Craft Industries, Inc. / United Television, Inc. and support their recommendation that the activities of the National Data Broadcasting Committee be fully considered.

2. *Can Subvideo Techniques Survive Compression?*

The Nielsen Company expressed concern that most subvideo techniques will not survive the network distribution process as it transitions to compressed digital video.

Nielsen states (§15) "Digital video compression will soon be widely used by cable operators, satellite carriers and telephone companies...to deliver programming to subscribers." They continue (§16), "Most 'subvideo' data transmissions will be ignored or deleted by compression systems...", and conclude (§17) that "Subvideo techniques are thus unusable as a practical matter...to Nielsen because they do not survive...compression."

In a related vein, the Comsat Corporation expressed concern that subvideo techniques will actually harm the process of digital video compression by introducing noise, and provided a short insight into certain aspects of the MPEG video compression process by way of making their concern clear.

We agree in part with both parties -- *baseband* subvideo techniques, such as the WavePhore approach, are unlikely to survive digital compression for the reasons given by Nielsen, and they are likely, for the reasons given by Comsat, to introduce a level of noise which could affect the compression process.

However, the D-Channel signal is not a baseband subvideo signal. It is not embedded within the video, and is not even added to the broadcast signal mix until reaching the transmitter itself. By employing a separate data path for distribution -- from source to transmitter -- the D-Channel concept assures delivery of reliable data and clean video, compressed or otherwise, throughout the distribution chain. Even if the source material is

received as an over-the-air signal with embedded data, the D-Channel portion can be easily removed with a simple filter^{8/} prior to demodulation to assure a clean video source for digital compression.

We also note that this simple filter offers a means to repeatedly remove and reinsert a D-Channel signal without causing a "generational" buildup of noise or other artifacts within the host video, a concern of the Commission (Notice ¶33) which we had failed to address in our original comments.^{9/}

3. *What about Data Distribution?*

Continuing the above discussion, the issue concerning Nielsen now becomes whether the data itself will be supported by the various links in the distribution process. The fact that independent data *can* be synchronized to specific analog video programs and moved over various distribution links should be known, since a system for this purpose has been implemented in Europe for a number of years. The NICAM audio subsystem is used to deliver digital stereo audio and data synchronized to PAL video programs in England, Scandinavia, Germany and other countries. An appropriate cost-effective infrastructure, including satellite links and tape recorders, has long been established.

The real issue is whether the U.S. distribution infrastructure will *choose* to support the data. This will be most likely to occur if a standard is developed in which the

^{8/} A modified VSB SAW filter, with a standard cutoff 500 kHz into the VSB region of the modulated signal but with a steeper slope, will provide sufficient attenuation of the data signal without affecting the modulated video. Even a standard VSB SAW will provide 10-12 dB of data attenuation, sufficient for two or three reinsertions.

^{9/} A proprietary filter is used for reinsertion.

industry has confidence. The process for this requires a thorough examination by impartial television experts, not the salesmanship of individual proponents. In our opinion the distribution question is most appropriately handled in a two-step process:

- First identify and standardize on the most reliable, highest speed method for over-the-air broadcast of NTSC-compatible data. This step is *mandatory* if we are to give broadcasters the best available technology with which to compete with cable, telco and satellite media.
- Then identify and put in place the necessary supporting infrastructure to move the data to the broadcasters.

If the network distribution issue raised by Nielsen and Comsat is allowed to influence the choice of actual over-the-air transmission technology, it is quite likely that broadcasters will be put at a serious disadvantage in their competition with other media, with either too little capacity or a comparatively unreliable signal.

4. *"Must Carry" Rules*

In addition to the issue of data distribution to broadcasters, we concur with the desire of En Technology^{10/} to have content-related data declared part of the "must carry" programming for cablecasters. We agree with WGBH Educational Foundation^{11/} in

^{10/} Comments of En Technology Corporation, dated 23 June 1995. See their note ^{13/} and accompanying text.

^{11/} Comments of the CPB-WGBH National Center for Accessible Media, undated. See section "Limitations on rejection of data are needed".

urging the Commission to adopt rules that would prohibit broadcasters and cablecasters from rejecting digital data material for solely competitive reasons.

5. *Does the D-Channel Filter Cause Pre-Echo Transient Artifacts?*

Zenith (op.cit., Issue 4) expressed a concern "...that the process of filtering out the television signal frequency image in the broadcast transmitter in order to insert the [D-Channel] data signal [might] adversely affect the pre-echo transient portion of the displayed picture." Both theory and expert observation indicate this is not a problem.

A standard NTSC transmitter is specified to have a flat frequency response from 750 kHz below the picture carrier to 4.2 MHz above the picture carrier, and (on the low side) to provide at least 20 dB of attenuation by band edge (-1.25 MHz). To provide spectrum for the digital data signal, the D-Channel insertion filter shifts the transmitter's VSB filter breakpoint to -500 kHz and steepens the slope, clearing the area between -750 kHz and bandedge. At the receiver the affected video segment (-500 kHz to -750 kHz) is substantially attenuated by the unit's Nyquist filter prior to demodulation -- typically some 14-20 dB across the band.^{12/} As a result of the receiver attenuation, any group delay effects from the altered transmit filter are minimized. Acceptability of the D-Channel insertion filter can be verified by review of the NDBC expert viewer test results for images when the data signal was off^{13/} -- perfect 5.0 scores for all sets, all images, both observers and both signal levels.

^{12/} EIA Standard RS-462.

^{13/} Comments of the National Association of Broadcasters and the Consumer Electronics Group of the Electronic Industries Association, Appendix A, "Results of Tests on WavePhore and Digideck Systems, November 28 - December 21, 1994". See pages 76 and 78.

5. *Status of the NDBC Proceedings*

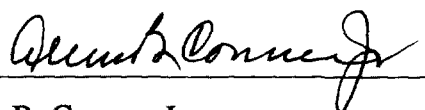
Finally, we wish to point out that while the joint comments of the NAB and the EIA-CEG^{14/} regarding the current status of the NDBC activity are true, they failed to note that only the Digideck D-Channel system has shown adequate performance to be approved for field testing. Quoting from the Conclusions and Recommendations of the Evaluation Working Group's report:^{15/}

"Based on the overall superiority of the laboratory test results obtained by the Digideck system, there is a consensus that this system should be tested in the field.

"There is an unresolved question about whether the WavePhore system should be tested in the field..."

Respectfully submitted,

DIGIDECK, INCORPORATED

By, 

Allen B. Conner, Jr.

President & CEO

^{14/}

Ibid, Section IV, "Current Status of the NDBC".

^{15/}

Ibid, Appendix B, "Report on the Laboratory Test Results", presented by the Evaluation Working Group to the National Data Broadcasting Committee, 10 March 1995. See Section 4.